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ABSTRACT

The Comprehensive School Mathematics Program (CSMP) is a program of CEMREL, Inc., one of the national educational laboratories, and was funded by the National Institute of Education (NIE). Its major purpose is the development of curriculum materials for kindergarten through grade 6. This study compared CSMP and non-CSMP students' performance at two sites using a streamlined revision of the Mathematics Applied to Novel Situations (MANS) test, with 10 program and 8 non-program classes examined. On 10 of 15 individual scales, CSMP classes scored significantly higher at the .05 level, and on 5 of those 10 at the .01 level. On the total of the MANS scales, CSMP classes averaged about 19 percent higher, a difference significant at the .01 level. The findings are seen to corroborate the results from more extended testing covered prior to the revisions. Results are also viewed as noteworthy because the simplification of testing procedures makes the evaluation easier for other districts to use and still leaves scales powerful enough to show various cognitive effects of the CSMP curriculum. (MP)

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Extended Pilot Trails of the Comprehensive School Mathematics Program

Evaluation Report 8-B-3

Evaluation of Revised Third Grade, MANS Green Level

Knowles Dougherty
Math Research and Evaluation Studies
October, 1981

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Description of Evaluation Report Series

The Comprehensive School Mathematics Program (CSMP) is a program of CEMREL, Inc., one of the national educational laboratories, and is funded by the National Institute of Education. Its major purpose is the development of curriculum materials for grades K-6.

Beginning in September, 1973, CSMP materials began being used in classrooms on a regular basis, beginning in kindergarten and first grade. The evaluation activities have paralleled the development and dissemination of materials so that the primary evaluation emphasis is now at the upper elementary grades. All activities have been conducted by a group within CEMREL which is independent of CSMP.

The evaluation of the program in this extended pilot trial is intended to be reasonably comprehensive and to supply information desired by a wide variety of audiences. For that reason the reports in this series are reasonably non-technical and do not attempt to widely explore some of the related issues. On the next page is given a list of reports through 1980. Below is given a list of reports completed in 1981:

Evaluation Report: 8-B-1 Sixth Grade Evaluation, Preliminary Study

8-B-2 Evaluation of Revised Second Grade, MANS Blue Level

8-B-3 Evaluation of Revised Third Grade, MANS Green Level

8-B-4 Three Evaluations of Gifted Student Use

8-C-1 Preliminary Study of CSMP "Graduates"

Extended Pilot Trials of the
Comprehensive School Mathematics Program

Evaluation Report Series

Evaluation Report (1974)	1-A-1	Overview, Design and Instrumentation
	1-A-2	External Review of CSMP Materials
	1-A-3	Final Summary Report Year 1
	1-B-1	Mid-Year Test Data: CSMP First Grade Content
	1-B-2	End-of-Year Test Data: CSMP First Grade Content
	1-B-3	End-of-Year Test Data: Standard First Grade Content
	1-B-4	End-of-Year Test Data: CSMP Kindergarten Content
	1-B-5	Test Data on Some General Cognitive Skills
	1-B-6	Summary Test Data: Detroit Schools
	1-C-1	Teacher Training Report
	1-C-2	Observations of CSMP First Grade Classes
	1-C-3	Mid-Year Data from Teacher Questionnaires
	1-C-4	End-of-Year Data from Teacher Questionnaires
	1-C-5	Interviews with CSMP Kindergarten Teachers
	1-C-6	Analysis of Teacher Log
Evaluation Report (1975)	2-A-1	Final Summary Report Year 2
	2-B-1	Second Grade Test Data
	2-B-2	Readministration of First Grade Test Items
	2-B-3	Student Interviews
	2-C-1	Teacher Questionnaire Data
	2-C-2	Teacher Interviews, Second Grade
	2-C-3	Teacher Interviews, First Grade
Evaluation Report (1976)	3-B-1	Second and Third Grade Test Data Year 3
	3-C-1	Teacher Questionnaire Data Year 3
Evaluation Report (1977)	4-A-1	Final Summary Report Year 4
	4-B-1	Standardized Test Data, Third Grade
	4-B-2	Mathematics Applied to Novel Situations (MANS) Test Data
	4-B-3	Individually Administered Problems, Third Grade
	4-C-1	Teacher Questionnaire Data, Third Grade
Evaluation Report (1978)	5-B-1	Fourth Grade MANS Test Data
	5-B-2	Individually Administered Problems, Fourth Grade
	5-C-1	Teacher Questionnaire and Interview Data, Fourth Grade
Evaluation Report (1979)	6-B-1	Comparative Test Data: Fourth Grade
	6-B-2	Preliminary Test Data: Fifth Grade
	6-C-1	Teacher Questionnaire Data: Grades 3-5
Evaluation Report (1980)	7-B-1	Fifth Grade Evaluation: Volume I, Summary
	7-B-2	Fifth Grade Evaluation: Volume II, Test Data
	7-B-3	Fifth Grade Evaluation: Volume III, Non-Test Data
	7-B-4	Re-evaluation of Second Grade, Revised MANS Tests
	7-B-5	Achievement of Former CSMP students at Fourth Grade
	7-B-6	Student Achievement, Rapid Implementation Model

Key to Indexing

Evaluation Reports are labelled m-X-n,
where m is the year of the pilot study, with 1973-74 as Year 1.
X is the type of data being reported where A is for overviews and summaries, B is for student outcomes and C is for other data.
n is the number within a given year and type of data.

Table of Contents

Evaluation Report 8-B-3
Evaluation of Revised Third Grade, MANS Green Level

Summary 1

Introduction 3

Setting 5

Results of the Testing 7

Comparison with Previous Results 17

Appendix A: The MANS Scale Item Statistics 19

Appendix B: List of Class Means 45

Summary

Thus study compared CSMP and non-CSMP students' performance at two sites using a streamlined revision of the MANS Tests (Mathematics Applied to Novel Situations, intended to assess some of the underlying thinking skills of the CSMP curriculum without using any of its special vocabulary). A total of 18 classes were tested, 10 CSMP and 8 non-CSMP. The CSMP classes had studied the revised version of the CSMP curriculum.

On the total of the MANS Scales, CSMP classes averaged about 19% higher scores than non-CSMP, a difference which was significant at the .01 level.

On ten of the fifteen individual scales, CSMP classes scored significantly higher at the .05 level, five of those ten at the .01 level. Their best performance was in scales dealing with number patterns and relationships, mental arithmetic, estimation, and word problems, followed by place value and negative numbers.

These findings corroborate the findings from the more extensive Extended Pilot Test, conducted prior to the revisions. The findings are also noteworthy because the simplification of the testing procedures makes the tests easier for other districts to use and still leaves the scales powerful enough to show various cognitive effects of the CSMP curriculum.

Introduction

The Comprehensive School Mathematics Program (CSMP) is a K-6 mathematics curriculum being developed and field tested by CEMREL, Inc. During the past few years, a special series of tests, the MANS Tests (Mathematics Applied to Novel Situations) has been developed for use in the evaluation of CSMP. This report presents two kinds of data.

a) Statistical data on a revised set of MANS scales

A series of 14 MANS scales was originally developed in 1977 for use in third grade in the CSMP Extended Pilot Test. Like all MANS scales they were intended to assess important mathematical thinking skills thought to underlie the CSMP curriculum, but in a novel context where possible and without using any of the special terminology and techniques of the CSMP curriculum. They required extensive directions and explanations, given in a standardized manner by specially trained testers. They were administered to 69 third grade classes, some CSMP and some non-CSMP, and the results of this experimental comparison are given in Evaluation Report 4-B-2.

Because of the expense and effort required to train testers, these scales have had limited utility outside the realm of CSMP Evaluation activities. In order to make them more widely available, these scales were revised in 1980-81. The primary objective was to simplify the directions enough that a local coordinator could fairly easily train a tester to carry out the testing. (Other revisions were also made based on statistical data from the original study and on new scales developed later in higher grades, but appropriate in concept for use with second graders.) These revised and new scales (15 altogether) were denoted as the MANS "Green" Level, intended for third graders, but appropriate for certain second and fourth grade classes as well.

b) Evaluation data for CSMP third graders (using revised curriculum)

After the completion of the Extended Pilot Test for the third grade curriculum, final revisions were made in the curriculum, as in the case with other grade levels. Thus it is possible to compare the results of this study with those from the original Extended Pilot Test in order to determine whether the relative achievement of CSMP students has changed with the revised curriculum.

Setting

The Green Level MANS Test was administered to 18 third grade classes in two school districts. Specific information about each site is given in Table 1.

Table 1
Description of Testing Sites

		Site 3	Site 6
Section of the Country		South	Midwest
Type of Community		Large City	Small City
Socio-Economic Background		Low	Middle
Number of Classes	CSMP	5	5
	Non-CSMP	4[1]	4
Average No. of Students/Class	CSMP	26	16
	Non-CSMP	28	18
Vocabulary Score[2] Class Mean	CSMP	22.7	41.2
	Non-CSMP	23.9	41.0

[1]Portions of these non-CSMP classes actually had some exposure to CSMP prior to grade three.

[2]For individual students, scores of 21, 29 and 37 correspond to the 25th, 50th and 75th percentiles respectively.

It should be noted that in Site 6, the classes were "upper track" classes; hence the high vocabulary scores

Overall, there were 10 CSMP classes and 8 non-CSMP classes. The mean across classes on the vocabulary test was 32.0 for CSMP and 32.4 for non-CSMP. All five of the teachers at Site 6 and two of the five at Site 3 were teaching CSMP for the first time. The other three at site three taught CSMP at least one year before. Essentially all the CSMP students at Site 3 had been in the program since first grade. All the CSMP students at Site 6 were new to the program in 1980-81.

Results of the Testing

The MANS Scales and Summary Statistics Across Classes

In the next few pages, the scales are listed by category. Preceding the name of each scale is a letter and number in parantheses: the letter referring to a content category and the number distinguishing between scales in that category. For each scale there is a brief description and a sample item. Also given are the number of items per form and some of the time limits. For a few scales, all students took the same form. But for most scales (those indicated by "x items, two forms"), each student took one of the two forms. For most scales, a flexible and sufficient amount of time was allowed. For a few scales, dealing with problems meant to be done without exact calculations, strict time limits were adhered to; for these particular scales, the allowed time has been shown.

The following procedure of analysis was used for each MANS scale. Individual students who did not have both a score on the scale and a vocabulary score were eliminated from the study (usually less than one per class). For the remaining students in each of the classes, two mean scores were calculated: on the MANS scale and on the vocabulary test. (Where a MANS scale had two forms, the mean for that scale was the sum of the means of the two forms.) An analysis of covariance procedure was then used with class means as the unit of analysis and vocabulary as the covariate.

Therefore, beside each scale description are three statistics. The first two are the adjusted mean for the 10 CSMP classes and the adjusted mean for the 8 non-CSMP classes, adjusted to take into account differences in ability, based on scores from the Gates-McGinitie Vocabulary Test, Level C, Form 1. The mean scores on this vocabulary test were almost identical: 32.0 for CSMP classes and 32.4 for non-CSMP classes. Hence the adjustment in the MANS scores was very small - less than 1% (adjusted upward for CSMP and downward for non-CSMP). The third statistic is the p-value of the resulting t-test: that is, the probability of such a result occurring by chance, if one assumes "no difference" between the two groups of classes. If the probability is small (less than .05) then the result is sometimes said to be "statistically significant", the implication being that there is a difference between the two groups of classes.

	Adjusted Means CSMP	Adjusted Means non-CSMP	p-Value
(C1) Computation	20.9	21.3	.82

Abstract: Items patterned after those in arithmetic computation sections of standard achievement tests for 3rd grade.
(17 items (+,−,x,÷), 2 forms)

Example:

$$\begin{array}{r} 124 \\ +305 \\ \hline \end{array} \qquad \begin{array}{r} 679 \\ -338 \\ \hline \end{array} \qquad \begin{array}{r} 53 \\ \times 3 \\ \hline \end{array} \qquad 84 \div 2 =$$

(C2) Large Number Computation	11.6	8.7	.01

Abstract: Put the number in the box which makes the number sentence true, where the box may be in any of the "3 positions" and where the numbers are large and easy to work with.
(10 items (+,−,x), 2 forms)

Examples:

$500 + \square = 800$

$\square - 150 = 50$

$2 \times 200 = \square$

(E) ESTIMATION

	Adjusted Means CSMP	Adjusted Means non-CSMP	p-Value
(E1) Two, Five or Ten	6.9	5.5	.06

Abstract: Quickly estimate whether a given number is about 2 or 5 or 10 times as large as another given number. A sample item was worked collectively. (12 items, one form, time limit: 3 minutes)

Examples:

65 is about _____ times as large as 12

602 is about _____ times as large as 298

(E2-E4) Estimating Intervals

Abstract: Given a computation problem, and 5 fixed intervals (0-10, 10-50, 50-100, 100-500, 500-1000), determine which interval contains the answer to the problem, and put an x in the interval. By instructions, format and time limits, students are discouraged from computing exact answers.

Examples:

(E2) Estimating Intervals - Addition							5.0	4.1	.02
19 + 29	0	10	50	100	500	1000			
279 + 165	0	10	50	100	500	1000			
(8 items, one form, time limit: 1½ minutes)									
(E3) Estimating Intervals - Subtraction							4.3	3.1	.01
105 − 8	0	10	50	100	500	1000			
827 − 231	0	10	50	100	500	1000			
(8 items, one form, time limit: 1½ minutes)									
(E4) Estimating Intervals - Multiplication							3.6	2.8	.01
2 x 209	0	10	50	100	500	1000			
5 x 11	0	10	50	100	500	1000			
(6 items, one form, time limit: 1½ minutes)									

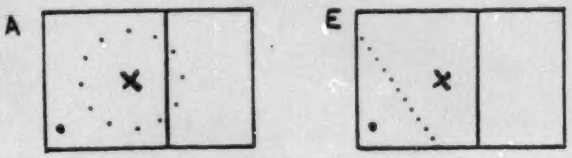
(G) GEOMETRY

Adjusted Means CSMP	Adjusted Means non-CSMP	p-Value
2.6	2.2	.21

(G1) Loci

Abstract: Presented with six pictures which have an identically placed line, "x" and "o" and a different series of dots, the student must determine which picture a given statement describes. No samples. First statement read by tester.
(6 items, 1 form)

Examples:



2. All the dots are the same distance from the x in picture ____.

5. Each dot is just as close to x as to o in picture ____.

(N) OTHER NUMBER SYSTEMS

(N1) Negative Numbers

Adjusted Means CSMP	Adjusted Means non-CSMP	p-Value
4.5	3.5	.04

Abstract: Given the starting score (which could be above or below zero), and how much the score went up or down, determine the final score. 2 sample items.
(4 items, 2 forms)

Examples:

Ann: Score at the start: 3 below zero
Then: Lost 4
Score at the end? 7 below zero 1 below zero 1 above zero 7 above zero

Billy: Score at the start: 2 above zero
Then: Lost 4
Score at the end? 6 below zero 2 below zero Zero 2 above zero

(R) NUMBER RELATIONS

	Adjusted Means CSMP	non-CSMP	p-Value
(R1) Solving Number Machines	3.8	3.0	.06
(R2) Using Number Machines	7.0	6.1	.06
(R4) Check the Larger?	10.2	8.2	.01

(R1) Solving Number Machines

Abstract: From 3 pairs of numbers (clues), determine what the person's game is (i.e. how the second number is derived from the first). Then use this knowledge to find the missing number from the 4th pair.
(4 items, 2 forms)

Examples:

MARIA'S GAME

	Class said:	Maria's answer:
First clue:	5	10
Second clue:	7	12
Third clue:	8	13
Question:	2	☐

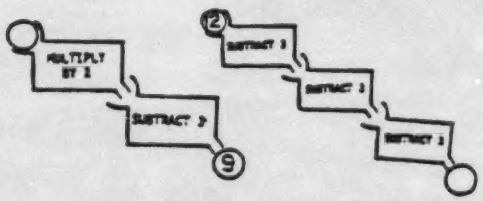
JIM'S GAME

	Class said:	Jim's answer:
First clue:	2	6
Second clue:	5	9
Third clue:	10	14
Question:	☐	12

(R2) Using Number Machines

Abstract: Given a number of labelled machines in sequence, find the initial or the terminating number, given the other. 3 samples.
(5 items, 2 forms)

Examples:



(R4) Check the Larger?

Abstract: Given two similar computation problems, choose the one which gives the larger answer. By instruction, format and time limits, students are discouraged from computing exact answers. The larger answer could always be determined more easily by inspection than by doing the computation.
(10 items, 2 forms)

Examples:

Sample Problem 1

200 ☐	173 + 174 ☐
2 X 127 ☑	172 + 175 ☐

Sample Problem 2

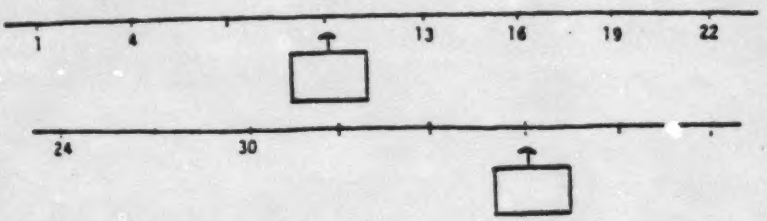
31 + 90 ☑	69 + 57 ☐
30 + 91 ☑	69 X 57 ☐

Adjusted Means CSMP	Adjusted Means non-CSMP	p-Value
6.4	4.8	.01

(R5) Number Line Labelling

Abstract: Given a number line with some of the marks labelled use the pattern shown to fill in the indicated blank with a label. A sample was worked collectively.
(5 items, 2 forms)

Examples:



(V) PLACE VALUE

8.0	6.9	.02

(V4) 1, 10, 100, 1000

Abstract: Given two numbers decide whether the first number is about 1, 10, 100, or 1000 more than the second. Two sample items.
(8 items, 2 forms, time limit: 2 minutes)

Examples:

4,265 is about 1 / 10 / 100 / 1000 more than 4,254

2,050 is about 1 / 10 / 100 / 1000 more than 2,039

(W) WORD PROBLEMS

		Adjusted Means CSMP	non-CSMP	p-Value
(W2)	Two Stage Word Problems	3.2	2.6	.03

Abstract: Word problems read to the students in which two different operations must be performed and where the numbers in the given data are relatively small.
(6 items, 1 form)

Examples:

On Saturday Amy and Susan made $13 selling lemonade.
On Sunday they made $5.
They put their money together and divided it evenly.
How much did each girl get? _____

There are 40 apples in our barrel now.
We will eat 2 apples every day.
How many apples will be left in our barrel after 5 days? _____

(W4)	Special (Word Problems)	3.5	2.7	.02

Abstract: A collection of six word problems which are computationally easy but unusual for third graders in different ways: (a) 3 stage solution required, (b and c) beginning state unknown (1 and 2 stage), (d) integral answer required, (e) ratio, (f) extraneous data. Read to the students.
(6 items, 1 form)

Examples:

(b) At first, Sally had some marbles.
Then, she lost 3 of them.
Then, she found 2 marbles.
After that, she still had 8 marbles left.
How many did she have at first? _____

(d) Sam has to move 10 boxes.
He can carry 3 boxes each trip.
How many trips will he need to make? _____

Summary of CSMP/non-CSMP Comparisons by MANS Category

The 15 individual MANS scales were grouped into 7 categories according to the content of the scale. Table 2 shows the adjusted means and p-value for each of these categories.

Table 2

MANS Results by Scale Category

Scale Category (specific scales)	Number of Items	Adjusted Mean Scores		p-Value
		CSMP Classes (n=10)	non-CSMP Classes (n=8)	
Computation (C1, C2)	54	32.5	30.0	.32
Estimation (E1, E2, E3, E4)	34	19.9	15.5	.01
Geometry (G1)	6	2.6	2.2	.21
Other Number Systems (N1) (Negative Numbers)	8	4.5	3.5	.04
Number Patterns and Relationships (R1, R2, R4, R5)	48	27.5	22.0	.01
Place Value (V4)	16	8.0	6.9	.02
Word Problems (W2, W4)	12	6.7	5.3	.01
TOTAL	178	101.7	85.6	.008

[1] Appendix A gives the means on each subtest for each class in the study.

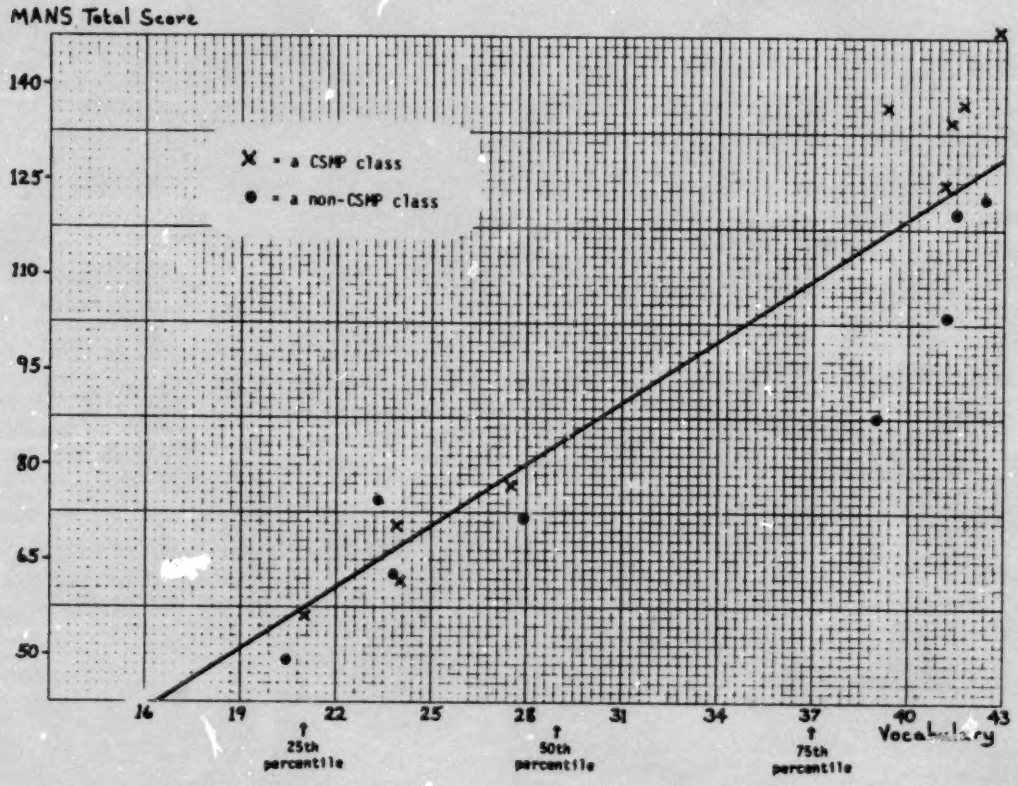
Table 2 shows that the difference between the CSMP and non-CSMP classes on the total MANS test was statistically significant in favor of CSMP. Further it shows that in each of the seven categories, there was a difference in favor of CSMP that was statistically significant in all but two of them: Computation and Geometry.

Graph of Class Means

In Figure 1 a graph is presented in which each class is represented by its mean on the vocabulary test and its mean on the total MANS score. Also shown is the regression line based on the present data. It shows the best estimate of a class mean on the Total MANS test for a given mean on the vocabulary test.

Figure 1

Class Means, Total MANS Score vs. Vocabulary



Note: Percentile ranks refer to scores of individual students.

Figure 1 shows the disparity of classes from the two sites in terms of their means on vocabulary: site six classes all in the first quartile and site three classes mostly in the third quartile, based on the national norms for individuals taking that section of the Gates McGinitie Test. In terms of CSMP/non-CSMP differences Figure 1 shows another difference between the two sites. Whereas, in site three,

all five CSMP classes outperformed all four non-CSMP classes relative to their ability in vocabulary; in site six the five CSMP classes did not have such a clear advantage. In fact, one non-CSMP class outperformed all but one CSMP class relative to their ability in vocabulary. It is noteworthy that the teacher of that non-CSMP class was a CSMP teacher the previous year. Appendix B gives the mean on each MANS scale for each class in the study.

Comparison With Previous Results

The present results, using the MANS Green Level and based on the revised curriculum, can be compared to those obtained in the Extended Pilot Test, using the original MANS Test based on the original curriculum. A scale-by-scale comparison of p-values was made for scales which were roughly comparable. These similar scales have been grouped together in Table 3, below. Three of the present scales and four of the previous scales are not shown because there were no comparable pairs of scales.

Table 3

Comparison of Present Results With Extended Pilot Trial Data, 1977
(Circled entries favor non-CSMP Classes, otherwise CSMP)

Category	Present Study Scale	Present Study p-value	Previous Study[1] p-value	Previous Study[1] Scale Designation
Computation	C1 Computation	(.82)	.21 .58	(See Report 4-B-1)
	C2 Large Number Computation	.01	.01	A5
Estimation	E1 2 or 5 or 10	.06	.03	B1
	E2 Estimating Intervals +	.02		
	E3 Estimating Intervals -	.01	.02	A2
	E4 Estimating Intervals x	.01		
Number Patterns and Relationships	R1 Solving Number Machines	.06	.01	A3
	R2 Using Number Machines	.06	.01	B2
	R4 Check the Larger	.01	.01	B4
	R5 Number Line Labeling	.01	.06	A6
Word Problems	W2 Two step Word Problems	.03	.01	A4[2]
	W4 Special Word Problems	.02	.14	B6[2]

[1] These scales and the results shown are described in Evaluation Reports 4-B-1 and 4-B-2.

[2] Scale B6 consisted of special word problems all of one type, whereas Scale W4 contained a few word problems of that same type, plus word problems of other special types.

The present results are very similar to those found previously. In both studies, CSMP students are much better than non-CSMP students in Number Patterns and Relationships, Estimation, Word Problems, and the mental arithmetic type of Computation. Non-CSMP students were slightly better in the standard arithmetic type of computation in the present study whereas CSMP students were somewhat better in the previous study, though neither result approached significance.

APPENDIX A

THE MANS SCALE AND ITEM STATISTICS

On the pages which follow, the items for each of the MANS scales are given, together with four statistics in a box beside each item. In the top two compartments are percentages: the first is the percent correct for CSMP students and the second is the percent correct for non-CSMP students. In the two bottom compartments are decimals: the first is the r-biserial for CSMP students, the second is the r-biserial for non-CSMP students. The r-biserial is a measure of the degree to which that particular item assesses the same thing as the rest of the scale.

Sample items and tester directions are not given, but for a few of the scales there are brief explanations for the reader's benefit.

At the bottom of each scale is a box containing statistics on the scale: the correlation between scale score and vocabulary score, the KR20 reliability coefficient for the scale, and the frequency distribution. The KR20 reliability coefficient, which is a measure of homogeneity of the scale (or the degree to which the items are measuring the same thing), has been adjusted (using the Spearman-Brown formula) to give an estimate of what the coefficient would have been if there had been 12 items in the scale. Thus, the corrected reliabilities of the various scales can be more realistically compared.

Below the box of scale statistics, further comments are sometimes given.

C1 Standard Computation (Form 1)

Addition

$$\begin{array}{r} 4 \\ 7 \\ 0 \\ +5 \\ \hline \end{array}$$

92%	90%
.85	.75

$$\begin{array}{r} 124 \\ +305 \\ \hline \end{array}$$

91%	93%
.36	.81

$$\begin{array}{r} 707 \\ +839 \\ \hline \end{array}$$

69%	75%
.77	.70

$$\begin{array}{r} 4,427 \\ +6,836 \\ \hline \end{array}$$

66%	66%
.74	.69

$\frac{2}{6} + \frac{3}{6} =$

15%	22%
.73	.48

Subtraction

$$\begin{array}{r} 49 \\ -7 \\ \hline \end{array}$$

83%	82%
.63	.59

$$\begin{array}{r} 679 \\ -338 \\ \hline \end{array}$$

80%	90%
.52	.50

$$\begin{array}{r} 1,000 \\ -742 \\ \hline \end{array}$$

26%	29%
.72	.58

$$\begin{array}{r} 846 \\ -69 \\ \hline \end{array}$$

35%	45%
.72	.77

$\frac{4}{5} - \frac{3}{5} =$

16%	20%
.74	.50

Multiplication

$5 \times 8 =$

79%	85%
.82	.87

$$\begin{array}{r} 53 \\ \times 3 \\ \hline \end{array}$$

61%	61%
.76	.73

$$\begin{array}{r} 34 \\ \times 4 \\ \hline \end{array}$$

51%	49%
.79	.67

$$\begin{array}{r} 213 \\ \times 12 \\ \hline \end{array}$$

15%	1%
.68	.21

Division

$12 \div 4 =$

65%	76%
.87	.80

$84 \div 2 =$

45%	26%
.74	.58

$230 \div 23 =$

17%	6%
.55	.45

	Correlations		Frequency Distribution by Percentages																	
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
CSMP	.51	.84	0	2	7	4	6	4	6	6	6	9	12	8	10	8	2	4	3	4
Non-CSMP	.64	.79	3	0	2	1	3	6	9	2	9	11	10	16	6	10	7	2	0	0

C1 Standard Computation (Form 2)

Addition

$$\begin{array}{r} 6 \\ +9 \end{array}$$

88%	89%
.72	.76

$$\begin{array}{r} 46 \\ +29 \end{array}$$

85%	83%
.67	.81

$$\begin{array}{r} 352 \\ +683 \end{array}$$

82%	83%
.52	.83

$$\begin{array}{r} 43 \\ 7{,}242 \\ 543 \\ +\ 70 \end{array}$$

79%	75%
.47	.63

$$\begin{array}{r} \frac{1}{5} \\ +\ \frac{2}{5} \end{array}$$

24%	33%
.68	.62

Subtraction

$$\begin{array}{r} 11 \\ -5 \end{array}$$

68%	77%
.67	.91

$$\begin{array}{r} 73 \\ -8 \end{array}$$

60%	67%
.73	.80

$$\begin{array}{r} 100 \\ -63 \end{array}$$

44%	48%
.78	.67

$$\begin{array}{r} 675 \\ -467 \end{array}$$

45%	64%
.56	.86

$$\begin{array}{r} \frac{5}{6} \\ -\ \frac{4}{6} \end{array}$$

24%	31%
.65	.70

Multiplication

$3 \times 4 =$

80%	89%
.48	.82

$$\begin{array}{r} 31 \\ \times\ 2 \end{array}$$

81%	80%
.72	.94

$$\begin{array}{r} 15 \\ \times\ 5 \end{array}$$

55%	70%
.64	.90

$$\begin{array}{r} 112 \\ \times\ 6 \end{array}$$

53%	65%
.79	.84

Division

76%	86%
.88	.92

$3\overline{)9}$

47%	69%
.58	.80

$8\overline{)72}$

67%	63%
.82	.72

$12\overline{)24}$

	Correlations		Frequency Distribution by Percentages																	
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
CSMP	.58	.83	2	1	1	5	2	3	4	9	4	10	7	8	3	11	14	5	10	4
Non-CSMP	.58	.88	5	0	0	2	2	5	0	4	5	4	5	7	7	12	6	11	14	11

C2 Mental Arithmetic (Form 1)

□ + 70 = 90

76%	68%
.81	.60

3 × □ = 300

52%	55%
.75	.51

□ + 125 = 250

51%	43%
.73	.71

2 × 200 = □

76%	72%
.66	.41

375 + □ = 600

38%	16%
.87	.75

□ × 250 = 500

40%	15%
.91	.67

□ − 200 = 100

46%	48%
.53	.52

$\frac{1}{2}$ of □ = 4

50%	25%
.94	.50

300 − □ = 250

42%	28%
.78	.73

□ of 21 = 7

40%	13%
.84	.40

	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.72	.90	9	13	8	6	7	12	6	4	12	13	10		
Non-CSMP	.58	.79	7	16	13	13	11	16	8	7	5	3	1		

C2 Mental Arithmetic (Form 2)

500 + ☐ = 800

80%	86%
.61	.28

☐ × 4 = 400

53%	49%
.81	.45

☐ + 35 = 65

70%	68%
.77	.38

☐ × 10 = 140

34%	23%
.69	.39

90 − ☐ = 60

73%	70%
.80	.45

3 × 125 = ☐

47%	44%
.79	.49

525 − ☐ = 225

58%	45%
.78	.33

$\frac{1}{3}$ of ☐ = 6

16%	10%
.68	.14

☐ − 150 = 50

25%	24%
.68	.48

☐ of 10 = 5

50%	28%
.68	.28

	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.70	.87	8	10	8	8	8	10	8	14	12	8	6		
Non-CSMP	.57	.65	0	10	10	14	14	15	23	7	7	1	0		

E1 2 or 5 or 10

2 or 5 or 10

29	is about	____	times as large as	3	63% .22	61% .28
608	is about	____	times as large as	305	51% .53	43% .50
45	is about	____	times as large as	8	60% .46	53% .52
195	is about	____	times as large as	21	70% .32	76% .29
20	is about	____	times as large as	9	59% .62	51% .71
499	is about	____	times as large as	99	49% .45	38% .49
98	is about	____	times as large as	51	50% .68	39% .72
65	is about	____	times as large as	12	54% .69	48% .62
98	is about	____	times as large as	11	56% .24	55% .25
61	is about	____	times as large as	29	39% .38	32% .19
$10\frac{1}{2}$	is about	____	times as large as	$5\frac{1}{2}$	58% .59	49% .43
$2\frac{1}{2}$	is about	____	times as large as	$\frac{1}{2}$	18% .04	19% .04

	Correlations		Frequency Distribution by Percentages											
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.58	.71	0	1	6	10	14	15	11	8	6	10	10	7	2
Non-CSMP	.42	.70	2	5	5	11	14	14	13	7	8	12	5	3	1

Comments:

Many students got between 3 and 5 correct, an indication that frequent guessing may have occurred.

E2 Estimating Intervals - Addition

(To show which two numbers the answer lies between, mark an "x" anywhere between those numbers.)

ADDITION

9 + 19	0	10	50	100	500	1000	81% / .53 | 77% / .46
270 + 270	0	10	50	100	500	1000	64% / .56 | 62% / .33
19 + 29	0	10	50	100	500	1000	58% / .51 | 52% / .45
51 + 53	0	10	50	100	500	1000	60% / .74 | 48% / .56
29 + 29	0	10	50	100	500	1000	62% / .77 | 49% / .44
279 + 165	0	10	50	100	500	1000	50% / .70 | 49% / .37
19 + 19 + 19	0	10	50	100	500	1000	44% / .46 | 32% / .21
$9 + \frac{1}{2}$	0	10	50	100	500	1000	47% / .61 | 20% / .40

	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.64	.83	3	9	10	14	9	11	13	19	12				
Non-CSMP	.41	.70	2	8	16	21	14	15	13	6	4				

Comments:

There appears to be wild guessing and perhaps that is inevitable with a timed estimation scale. Nevertheless, the most popular wrong answers were always in the interval closest to the correct one.

E3 Estimating Intervals - Subtraction

(See E2)

SUBTRACTION

90−12	0	10	50	100	500	1000	70% 57% .61 .30
559−558	0	10	50	100	500	1000	48% 39% .78 .52
105−8	0	10	50	100	500	1000	64% 47% .68 .38
900−601	0	10	50	100	500	1000	56% 43% .70 .46
100−93	0	10	50	100	500	1000	34% 19% .72 .75
137−125	0	10	50	100	500	1000	40% 27% .68 .29
827−231	0	10	50	100	500	1000	32% 28% .37 .12
990−110	0	10	50	100	500	1000	51% 35% .46 .35

	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.52	.84	7	13	12	16	10	12	8	14	8				
Non-CSMP	.42	.68	5	19	25	19	15	5	4	6	2				

Comments:

Same comment as in E2 except here the popular wrong answer was not always in the interval closest to the correct one. Item #7 seemed to be a poor one.

E4 Estimating Intervals - Multiplication

(See E2)

MULTIPLICATION

4 x 23	0	10	50	100	500	1000	55% / .51 | 49% / .39
2 x 209	0	10	50	100	500	1000	67% / .60 | 56% / .40
2 x 19	0	10	50	100	500	1000	67% / .67 | 61% / .34
5 x 11	0	10	50	100	500	1000	63% / .5[illegible] | 55% / .48
3 x 211	0	10	50	100	500	1000	52% / .50 | 36% / .47
$\frac{1}{2}$ x 15	0	10	50	100	500	1000	37% / .45 | 4% / -.05

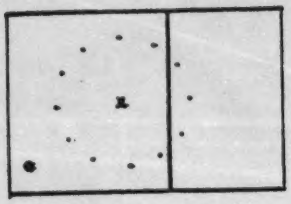
	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.53	.82	8	9	15	18	18	16	16						
Non-CSMP	.41	.70	11	11	25	25	14	15	0						

Comments:

The last item, using a fraction, was responsible for much of the CSMP advantage on this scale.

G1 Loci

A



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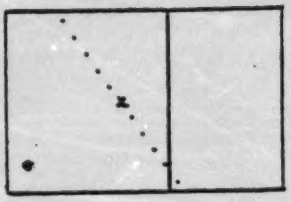

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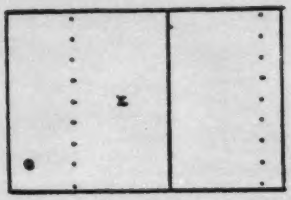

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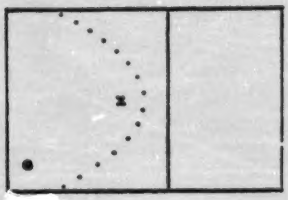
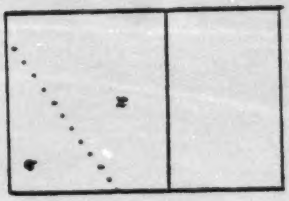


E



F

1. All the dots are the same distance from the line in picture _____.

52%	55%
.55	.42

2. All the dots are the same distance from the x in picture _____.

35%	30%
.61	.76

3. All the dots are on the same line as x and o in picture _____.

51%	48%
.58	.48

4. Each dot is closer to x than to o in picture _____.

30%	25%
.61	.70

5. Each dot is just as close to x as to o in picture _____.

37%	35%
.61	.63

6. Each dot is just as close to x as to the line in picture _____.

29%	21%
.64	.50

	Correlations		Frequency Distribution by Percentages											
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.57	.84	18	23	19	14	12	[illegible]	11						
Non-CSMP	[illegible]	.83	20	21	25	14	8	4	8						

Comment:

The [illegible] locus may be too difficult for many third graders.

N1 Negative Numbers (Form 1)

Ann: Score at the start: 3 below zero

Then: Lost 4

32%	29%
.88	.78

Score at the end? 7 below zero 1 below zero 1 above zero 7 above zero

Dave: Score at the start: 5 below zero

Then: Won 2

39%	30%
.73	.63

Score at the end? 7 below zero 3 below zero 3 above zero 7 above zero

Henry: Score at the start: Zero

Then: Lost 9

53%	34%
.67	.66

Score at the end? 9 below zero Zero 9 above zero

Sue: Score at the start: 2 below zero

Then: Won 5

41%	28%
.76	.66

Score at the end? 7 below zero 3 below zero 3 above zero 7 above zero

	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.53	.92	29	28	11	9	22								
Non-CSMP	.46	.89	39	33	8	7	13								

N1 Negative Numbers (Form 2)

Ann: Score at the start: 2 below zero

33%	19%
.62	.58

Then: Lost 3

Score at the end? 5 below zero 1 below zero 1 above zero 5 above zero

Billy: Score at the start: 2 above zero

58%	54%
.48	.30

Then: Lost 4

Score at the end? 6 below zero 2 below zero Zero 2 above zero

Sam: Score at the start: Zero

74%	72%
.57	.35

Then: Won 8

Score at the end? 8 below zero Zero 8 above zero

Nancy: Score at the start: 7 above zero

65%	66%
.43	.35

Then: Lost 2

Score at the end? 9 below zero 5 below zero 5 above zero 9 above zero

	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.69	.83	9	22	24	21	24								
Non-CSMP	.40	.74	8	19	40	17	16								

Comments on Further Revisions:

Note that this form was easier than Form 1 and had lower KR20's. Over the years it has been noticed that a significant number of students use a "rule" for these items that must go something like the following: If it says "Lost", subtract and make it below zero; if it says "Won", add and make it above zero. This form has two such items and Form 1 only has one. It is difficult to pick a set of samples and items for which that "rule" does not cause problems.

R1 Solving Number Rules (Form 1)

(Use the three clues to figure out what the student's game is, and then answer the question.)

(Page 1)

MARIA'S GAME

	Class said:	Maria's answer:
First clue:	5	10
Second clue:	7	12
Third clue:	8	13
Question:	2	☐

65%	48%
.49	.47

BILL'S GAME

	Class said:	Bill's answer:
First clue:	9	3
Second clue:	15	5
Third clue:	30	10
Question:	6	☐

19%	18%
.60	.73

(Page 2)

PAUL'S GAME

	Class said:	Paul's answer:
First clue:	6	3
Second clue:	16	13
Third clue:	8	5
Question:	☐	9

35%	24%
.75	.70

JANE'S GAME

	Class said:	Jane's answer:
First clue:	6	12
Second clue:	2	4
Third clue:	7	14
Question:	☐	8

46%	38%
.65	.58

	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.65	.87	24	29	17	19	12								
Non-CSMP	.52	.86	33	34	14	9	10								

R1 Solving Number Rules (Form 2)

(Page 1)

SUSAN'S GAME

	Class said:	Susan's answer:
First clue:	3	1
Second clue:	11	9
Third clue:	10	8
Question:	15	☐

48%	36%
.90	.89

JOHN'S GAME

	Class said:	John's answer:
First clue:	3	12
Second clue:	5	20
Third clue:	10	40
Question:	4	☐

33%	32%
.75	.81

(Page 2)

JIM'S GAME

	Class said:	Jim's answer:
First clue:	2	6
Second clue:	5	9
Third clue:	10	14
Question:	☐	12

49%	40%
.94	.88

TINA'S GAME

	Class said:	Tina's answer:
First clue:	10	5
Second clue:	4	2
Third clue:	8	4
Question:	☐	3

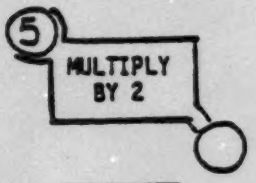
30%	25%
.54	.71

	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.66	.92	39	13	11	23	14								
Non-CSMP	.56	.93	48	11	15	13	14								

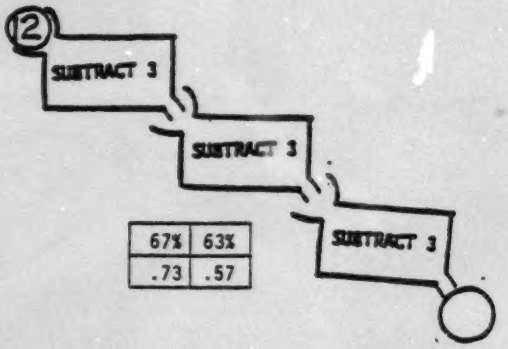
Comments:

Overall on the two forms, over one-third of the students didn't get any questions correct and may not have understood the idea of a relationship.

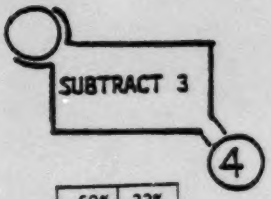
R2 Using Number Machines (Form 1)



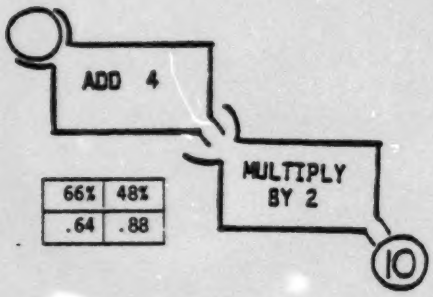
85%	82%
.58	.46



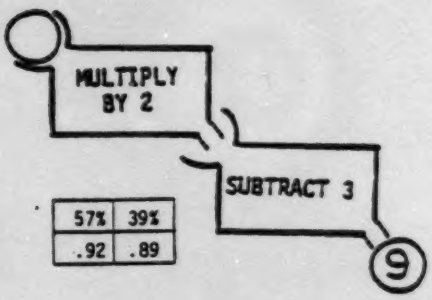
67%	63%
.73	.57



60%	33%
.79	.75



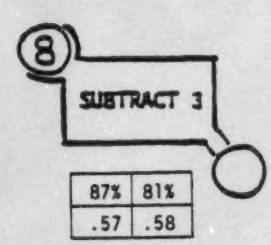
66%	48%
.64	.88

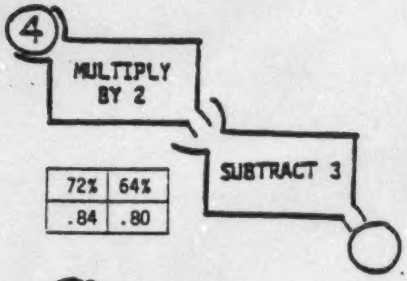


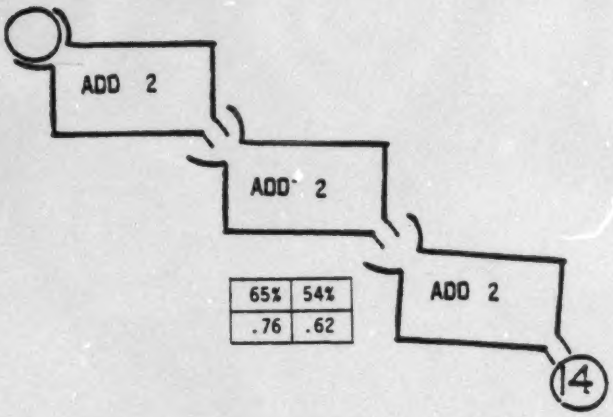
57%	39%
.92	.89

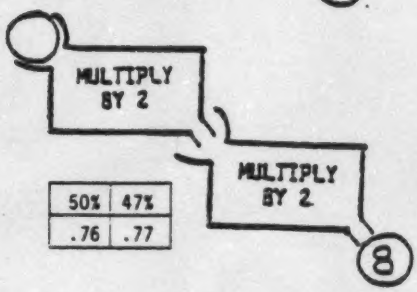
	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.58	.89	7	11	14	14	16	39							
Non-CSMP	.70	.89	11	17	23	14	11	23							

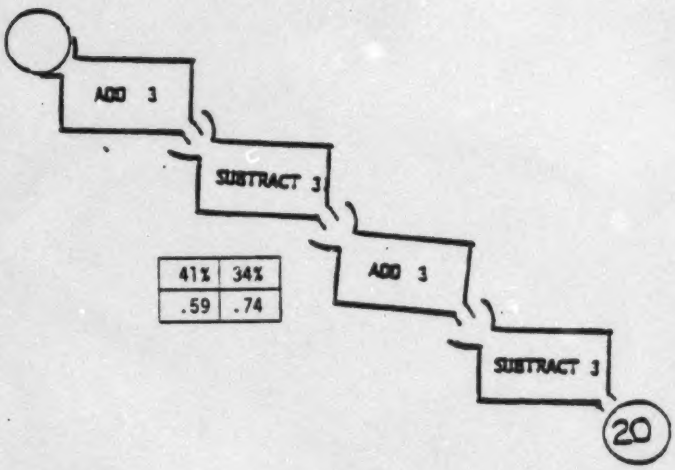
R2 Using Number Machines (Form 2)











	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.66	.88	6	14	17	14	17	31							
Non-CSMP	.69	.89	13	12	18	18	16	23							

R4 Which is Larger (Form 1)

(Check the box for the larger one, or check both boxes if they're equal.)

$30 + 40 + 50 + 60$ ☐	59%	65%
$29 + 39 + 49 + 59$ ☐	.01	.11

$0 + 539$ ☐	80%	78%
0×53 ☐	.62	.62

$585 + 250$ ☐	58%	65%
$580 + 290$ ☐	.47	.19

$705 - 62$ ☐	37%	28%
$704 - 61$ ☐	.56	.30

$69 + 57$ ☐	60%	39%
69×57 ☐	.53	.29

1×76 ☐	36%	29%
$0 + 76$ ☐	.75	.40

400 ☐	73%	75%
$112 + 123 + 111 + 108$ ☐	.64	.49

$\frac{1}{3}$ ☐	22%	12%
$\frac{1}{4}$ ☐	.14	.10

$499 + 399$ ☐	36%	36%
$299 + 599$ ☐	.61	.52

$\frac{1}{2} \times 74$ ☐	14%	5%
$\frac{1}{2} + 74$ ☐	.41	.07

	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.61	.73	4	4	11	13	15	12	18	9	8	5	1		
Non-CSMP	.38	.57	3	8	6	14	18	25	17	9	1	1	0		

R4 Which is Larger (Form 2)

$62 + 50$ ☐

$61 + 60$ ☐

78%	72%
.48	.50

$61 + 61 + 61 + 70 + 70$ ☐

$60 + 60 + 60 + 71 + 71$ ☐

30%	23%
.35	.53

1×64 ☐

$1 + 64$ ☐

46%	43%
.17	.30

$173 + 174$ ☐

$172 + 175$ ☐

48%	50%
.61	.44

5×69 ☐

$69 + 69 + 69$ ☐

62%	47%
.67	.63

300 ☐

$98 + 98 + 98$ ☐

42%	26%
.62	.34

$500 - 182$ ☐

$500 - 181$ ☐

40%	26%
.87	.63

$\frac{1}{2} + \frac{1}{2} + \frac{1}{2}$ ☐

$1 + 1 + 1$ ☐

42%	11%
.69	.51

$709 - 410$ ☐

$809 - 510$ ☐

32%	.6%
.69	.50

$\frac{1}{2}$ of 1,000 ☐

$\frac{1}{3}$ of 1,000 ☐

39%	16%
.64	.54

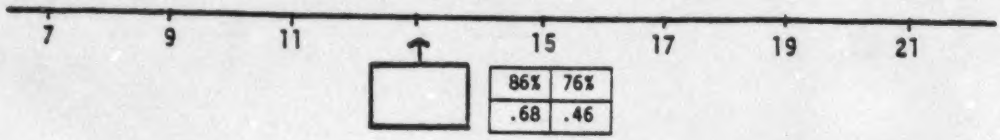
	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.70	.81	5	9	15	11	11	9	11	7	12	4	5		
Non-CSMP	.53	.73	9	14	22	17	6	14	10	5	3	1	0		

Comments:

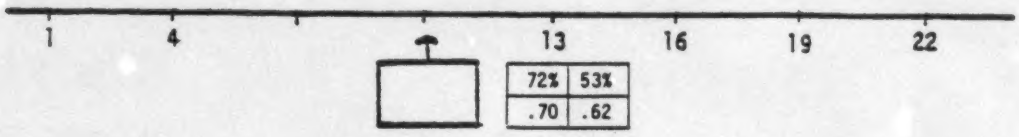
Some items, mostly on Form 1, have low biserials.

The time limits were intentionally short to prevent exact calculation; nevertheless about 20% of the students did not complete more than six items.

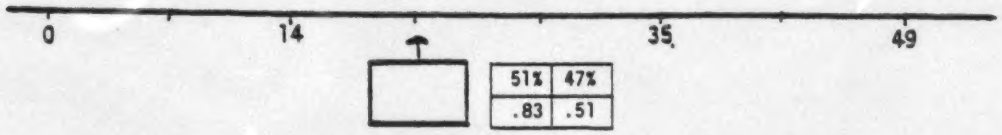
R5 Labelling Number Lines (Form 1)



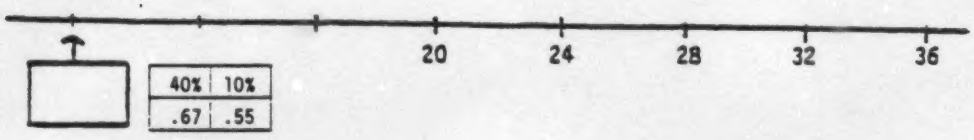
86%	76%
.68	.46



72%	53%
.70	.62



51%	47%
.83	.51

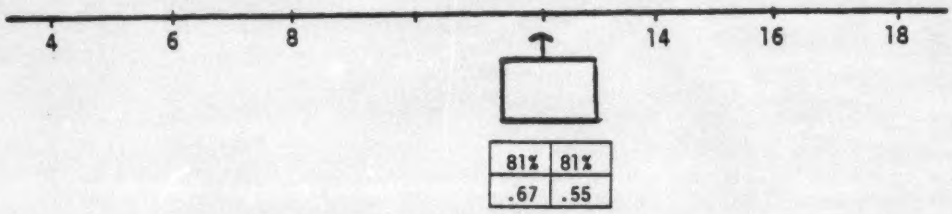


40%	10%
.67	.55

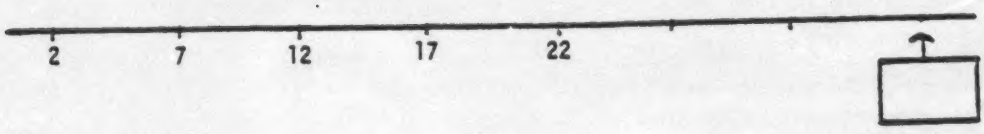
35%	24%
.69	.67

	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.53	.89	11	11	21	19	15	23							
Non-CSMP	.49	.82	14	26	21	16	21	2							

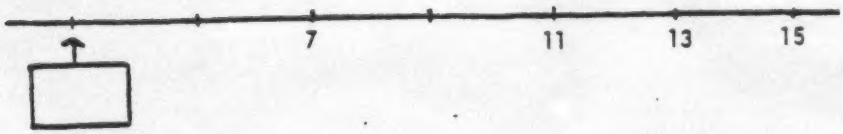
R5 Labelling Number Lines (Form 2)



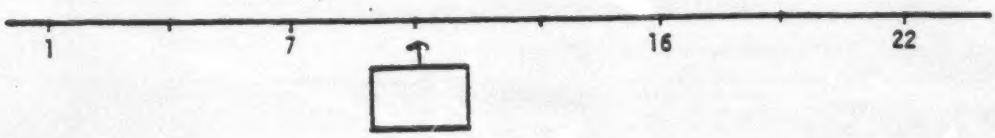
81%	81%
.67	.55



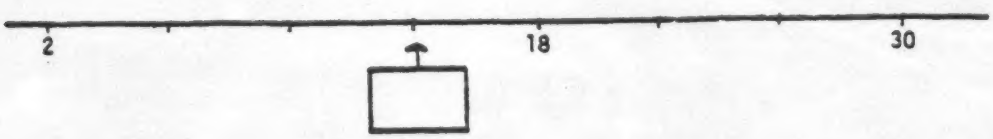
67%	60%
.88	.38



60%	37%
.64	.56



50%	28%
.75	.49



40%	25%
.49	.50

	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.57	.88	9	17	13	14	23	24							
Non-CSMP	.54	.79	13	13	31	20	14	7							

V4 Place Value 1, 10, 100, 1000 (Form 1)

4,265 is about 1 / 10 / 100 / 1000 more than 4,254

65%	52%
.39	.29

4,960 is about 1 / 10 / 100 / 1000 more than 4,851

16%	17%
-.43	-.16

7,329 is about 1 / 10 / 100 / 1000 more than 7,227

46%	37%
.27	.46

2,050 is about 1 / 10 / 100 / 1000 more than 2,039

57%	54%
.62	.33

60,482 is about 1 / 10 / 100 / 1000 more than 59,481

53%	36%
.30	.46

2,987 is about 1 / 10 / 100 / 1000 more than 2,001

36%	30%
.03	.11

1,001 is about 1 / 10 / 100 / 1000 more than 998

21%	13%
.28	-.05

$423\frac{1}{2}$ is about 1 / 10 / 100 / 1000 more than $422\frac{1}{3}$

42%	23%
.28	.25

	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.44	.52	3	14	16	20	18	22	5	3	0				
Non-CSMP	.53	.51	7	22	23	18	15	11	3	0	0				

V4 Place Value 1, 10, 100, 1000 (Form 2)

8,498 is about 1 / 10 / 100 / 1000 more than 8,407

52%	54%
.58	.30

4,408 is about 1 / 10 / 100 / 1000 more than 4,399

44%	34%
.05	.06

799 is about 1 / 10 / 100 / 1000 more than 790

74%	72%
.45	.61

9,097 is about 1 / 10 / 100 / 1000 more than 8,002

55%	49%
.30	.34

3,002 is about 1 / 10 / 100 / 1000 more than 1,998

62%	54%
.37	.39

5,047 is about 1 / 10 / 100 / 1000 more than 4,951

28%	45%
.03	-.07

301 is about 1 / 10 / 100 / 1000 more than 299

28%	37%
.63	.29

$1,275\frac{1}{4}$ is about 1 / 10 / 100 / 1000 more than $1,274\frac{1}{2}$

41%	23%
.68	.23

	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.54	.68	2	11	15	21	10	19	13	8	2				
Non-CSMP	.57	.55	5	5	16	22	17	23	8	4	1				

Comments:

Many items had low biserials, the KR20 was low and guessing was probably a factor.

W2 Two-Step Word Problems

1. Last year there were 25 rats on our island.
   Since then 5 rats have died and 3 were born.
   How many rats are on our island now? _____

75%	79%
.71	.63

2. On Saturday Amy and Susan made $13 selling lemonade.
   On Sunday they made $5.
   They put their money together and divided it evenly.
   How much did each girl get? _____

57%	45%
.68	.60

3. Our hens lay 9 eggs every day.
   Each day we eat 6 of them and give the others away.
   During the next 5 days how many eggs will we give away? _____

42%	31%
.75	.79

4. Jim has $10 in his bank now.
   Each week he will save $5.
   In how many weeks will he be able to buy a radio that costs $30. _____

40%	27%
.57	.61

5. There are 40 apples in our barrel now.
   We will eat 2 apples every day.
   How many apples will be left in our barrel after 5 days? _____

50%	32%
.72	.59

6. There are 2 piles of cartons.
   Each pile has 3 cartons.
   Each carton has 4 jugs.
   How many jugs are there altogether? _____

23%	21%
.70	.63

	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.64	.88	15	16	16	13	13	17	10						
Non-CSMP	.55	.86	18	20	23	11	12	12	5						

W4 Special Word Problems

1. A bus started out with 10 people.
   First, 5 people got off.
   Then, 3 people got on.
   Finally, 2 people got off.
   How many people did the bus have then? _____

84%	69%
.21	.30

2. Tina has 4 pencils.
   Tina has half as many pencils as Tom.
   How many pencils does Tom have? _____

49%	41%
.61	.50

3. Sam has to move 10 boxes.
   He can carry 3 boxes each trip.
   How many trips will he need to make? _____

50%	46%
.54	.41

4. At first, Sally had some marbles.
   Then, she lost 3 of them.
   Then, she found 2 marbles.
   After that, she still had 8 marbles left.
   How many did she have at first? _____

31%	15%
.58	.39

5. 1 quart holds 2 pints of milk.
   1 pint holds 2 cups of milk.
   2 quarts holds how many cups of milk? _____

22%	18%
.46	.33

6. James is 3 years old.
   Bill is 7 years old.
   How old will James be in 5 years? _____

85%	76%
.51	.54

	Correlations		Frequency Distribution by Percentages												
	With Vocabulary	Adjusted KR20	0	1	2	3	4	5	6	7	8	9	10	11	12
CSMP	.68	.77	1	13	24	17	21	13	9						
Non-CSMP	.57	.72	6	17	25	22	18	8	3						

APPENDIX B

LIST OF CLASS MEANS

Table 4, below, gives the mean on each MANS scale for each of the 18 classes in this study. The one-digit numbers refer to CSMP classes, two-digit to non-CSMP. The scale designations (a letter and a number) are keyed to those that appear with the scale names and descriptions throughout this report.

Table 4

List of Class Means, Third Grade MANS Testing, 1981

DIST	CLASS	COMPUTATION		ESTIMATION				GEOM	NEGATIVE NUMBERS	NUMBER PATTERNS AND RELATIONSHIPS				PLACE VALUE	WORD PROBS		TOTAL	READING VOCABL
		C1	C2	E1	E2	E3	[illegible]	G1	N1	R1	R2	R4	R5	V4	W2	W4		
5	1	15.0	8.2	4.7	4.9	4.2	3.4	1.7	3.2	1.4	5.7	8.0	5.0	5.7	2.5	2.7	76.7	27.5
5	2	14.3	7.7	4.8	2.6	2.4	2.4	1.5	2.2	1.6	5.4	5.2	3.9	5.9	1.7	2.0	63.8	16.9
5	3	15.1	6.0	4.3	3.2	2.2	2.2	1.3	2.5	2.2	4.8	7.2	3.4	5.4	1.9	2.5	61.5	24.0
5	4	20.7	7.1	5.2	3.1	1.9	2.5	1.6	2.2	2.1	4.8	6.2	4.2	5.2	1.4	2.6	78.5	23.9
5	5	13.2	5.4	4.7	2.2	1.8	2.6	0.8	2.1	0.8	2.1	7.8	3.8	5.5	1.4	2.0	56.8	21.8
5	51	12.3	4.1	3.7	2.7	2.1	1.6	1.0	2.4	1.2	1.9	5.4	3.2	4.6	1.2	1.9	49.3	20.4
5	52	21.1	8.0	5.8	3.9	2.7	2.3	1.6	2.6	2.4	4.0	7.3	3.8	4.8	1.7	2.2	74.3	25.3
5	53	26.2	7.1	4.6	3.1	2.0	2.9	1.3	2.3	1.8	3.9	5.7	3.5	5.2	1.1	1.8	71.6	[illegible]7
5	54	14.3	6.7	4.6	3.8	2.3	1.9	1.5	2.1	1.8	5.3	6.0	3.0	5.2	2.3	2.4	62.5	[illegible]3.8
6	1	25.1	16.0	9.1	7.3	6.1	4.5	3.5	7.8	5.3	9.1	14.0	8.7	9.1	4.5	4.9	134.2	41.3
6	2	23.9	16.2	9.1	6.6	5.9	4.7	4.1	6.7	6.1	9.2	14.6	8.9	11.8	5.8	5.0	137.1	41.7
6	3	27.0	17.7	8.8	7.8	6.3	4.8	2.5	6.7	6.7	9.7	12.0	9.7	9.3	4.5	4.8	136.7	39.3
6	4	32.7	17.4	9.8	6.4	5.9	5.3	4.5	6.6	6.2	9.7	15.3	8.4	11.1	4.6	4.8	140.7	42.8
6	5	23.5	12.7	7.8	6.7	6.0	4.3	4.0	5.9	5.1	[illegible].2	11.9	8.3	10.7	4.3	4.3	124.7	41.1
6	51	25.8	10.2	6.5	3.9	4.2	3.8	3.4	3.9	4.1	6.8	9.3	5.9	8.4	4.1	4.8	103.6	41.2
6	52	19.7	9.3	2.9	5.0	3.9	3.7	1.4	2.4	2.8	7.3	9.9	5.8	8.6	3.1	1.5	87.5	39.8
6	53	25.3	13.8	8.2	5.9	4.8	3.7	3.9	5.4	5.8	9.4	11.8	7.8	8.5	4.8	4.3	122.1	42.4
6	54	26.7	12.5	8.6	5.3	4.3	3.3	3.9	6.8	5.1	8.8	11.7	6.3	10.2	3.5	3.6	119.8	41.5

15